

## CLAIMS

1. A circuit for providing a DC bipolar output voltage from an fixed DC unipolar input supply source comprising:
  - a regulated oscillator block providing a predetermined oscillation frequency, wherein
  - 5 the oscillation frequency is in response to a boosted voltage level feedback;
  - a dual phase cycling block receiving the predetermined oscillation frequency,
  - wherein the dual phase cycling block outputs a set of controls signals;
  - a switch capacitor block receiving control signals from the dual phase cycling block to control the switching of capacitors in a switch capacitor, wherein the switch
  - 10 capacitor block provides a means of current sourcing having a boosted voltage level that is routed to the boosted voltage level feedback for the regulated oscillator block, and wherein the switch capacitor block provides a means of current sinking with an inverted voltage level, wherein the amount of source or sink current is interrelated to the oscillation frequency, switched capacitor capacity and their respective controlling
  - 15 switches and devices.
2. The apparatus in claim 1 wherein the device is integrated with other electronics in a single silicon substrate.
3. The apparatus in claim 1 wherein the dual phase cycling block alternately charges a pair of storage capacitors VCC and VSS.
- 20 4. The apparatus in claim 1 wherein the VDD and VSS voltage level are compared with a reference voltage level to determine if VDD or VSS voltage level reaches the pre-determined level.
5. An apparatus for generating a bipolar output voltage from a unipolar input comprising:
  - at least two voltage terminals producing bipolar output voltages;
  - 25 at least two first switching devices charging a first switching capacitor to a first voltage equal to said unipolar input supply voltage;

at least two second switching devices operative upon activation to charge a second switching capacitor equal to said first voltage to provide a third voltage;  
a third switching capacitor receiving and storing said first voltage upon activation;  
a fourth switching capacitor receiving and storing said third voltage upon  
5 activation.

6. The apparatus in claim 5 further including an oscillator for generating signals to activate said switching devices.

7. The apparatus in claim 5 wherein at least one said switching device is a transmission gate forming by a P-channel metal oxide semiconductor, an N-channel metal oxide  
10 semiconductor, and an inverter.

8. The apparatus in claim 5 wherein said switching device can be a unidirectional passive diode.

9. The apparatus in claim 5 wherein the device is integrated with other electronics in a single silicon substrate.

15 10. A circuit for providing a bipolar output voltage from an fixed unipolar input supply source comprising:

a plurality of first switching devices operative to charge a first transfer switching capacitor to a first voltage equal to said unipolar input supply voltage, having one said switching device selectively connecting between said supply voltage and a first  
20 end of said first switching capacitor, one said switching device selectively connecting a second end of said first switch capacitor to ground;

a plurality of second switching devices operative upon activation to charge a second switching capacitor equal to and a polarity opposite to said first voltage to provide a third voltage, having one said switching device selectively connecting  
25 between said first end of said first switching capacitor and a first end of said second

switching capacitor, and one said switching device selectively connecting said second end of said second capacitor to ground;

a third switching capacitor receiving and storing said first voltage upon activation while having one said switching device selectively connecting between said first

5 end of said switching capacitor and a first end of said third switching capacitor, whereas said second end of said third switching device connects to ground;

a fourth switching capacitor receiving and storing said third voltage upon activation.

11. The circuit of claim 10 further including an oscillator for generating signals to activate  
10 said switching devices.

12. The circuit of claim 10 wherein at least one said switching device is a transmission gate forming by a P-channel metal oxide semiconductor, an N-channel metal oxide semiconductor, and an inverter.

13. The circuit of claim 10 wherein said switching device can be a unidirectional passive  
15 diode.

14. The circuit of claim 10 wherein the device is integrated with other electronics in a single silicon substrate.